Feb. 1, 1955 H. J. SCHMITT 2,701,158

MAGNETIC DOOR CATCH

Filed May 6, 1954

Fig. 1.

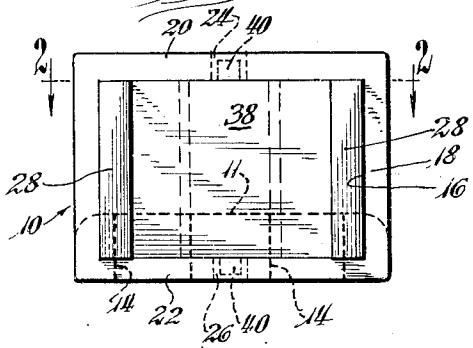


Fig. 3.

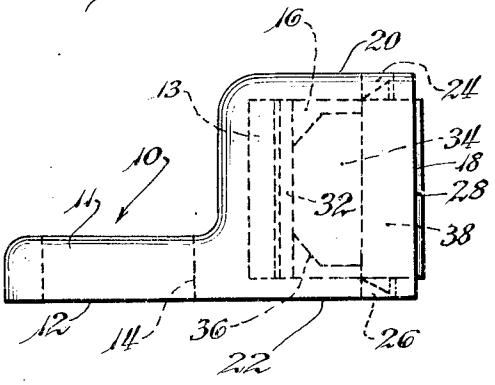


Fig. 2.

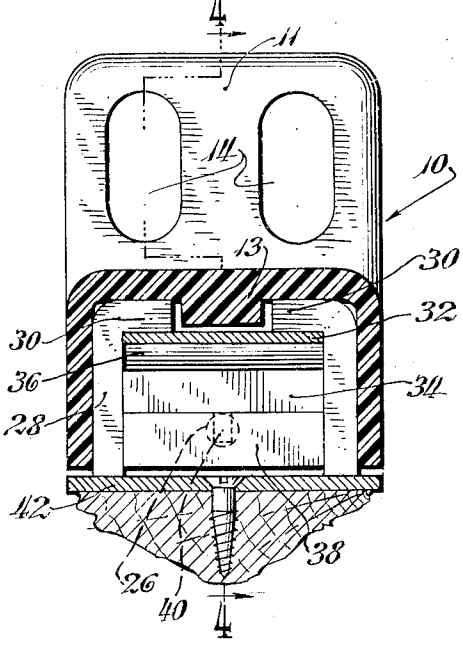
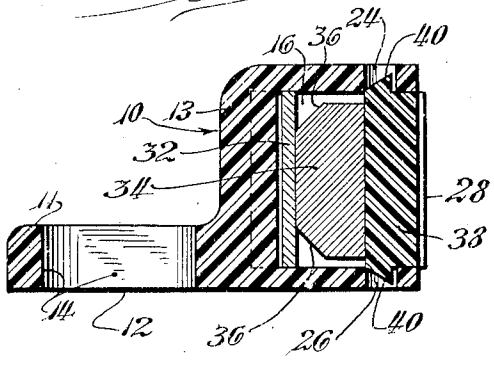


Fig. 4.



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United States Patent Office 2,701,158
Patented Feb. 1, 1955

2,701,158

MAGNETIC DOOR CATCH

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Application May 6, 1954, Serial No. 427,902

3 Claims. (Cl. 292—251.5)

The present invention relates to magnetic door catches of the type which comprises a permanent magnet secured to a shelf or door framework such that the magnet retains a door in closed position by attracting an iron armature secured to the door.

One of the objects of my invention is to provide an improved magnetic door catch of the type above described which is neat in appearance and which can be manufactured at extremely low cost.

An additional object is to provide a novel door catch of the type indicated above which has a highly efficient magnetic circuit and in which the elements are easy to fabricate and assemble.

Other objects and advantages will become apparent from the following description of a preferred embodiment of my invention which is illustrated in the accompanying drawings.

In the drawings, in which similar characters of reference denote similar parts throughout the several views,

Fig. 1 is a front view of the permanent magnet portion of the magnetic catch and the housing and mounting provision therefor which forms the subject matter of the present invention;

Fig. 2 is a horizontal, sectional view taken in a downwardly direction, as indicated by the arrows, along the line 2—2 of Fig. 1 in a position just within the top of the case. In this view the armature and its relationship to the remaining portion is also shown;

Fig. 3 is a side view of the door catch; and

Fig. 4 is a longitudinal, vertical sectional view which may be considered as taken in the direction of the arrows substantially along the line 4—4 of Fig. 2.

By referring to the drawings it will be apparent that the magnet case, indicated generally by the numeral **10**, has a flat lower face as at **12**, which is adapted for direct placement against a shelf or other framework just within the door opening. The rearward portion **11** of the case member **10** is of thinner section than the remaining portion **13** thereof and forms a mounting bracket. It is provided, as shown, with two longitudinally slotted openings **14** through which screws can be passed for securing the case in place.

The forward thick portion **13** of the case has a rectangular recess **16** formed therein from the front face indicated at **18**. As shown, this recess is approximately as deep as it is high and is of the order of one and one-half times as long as it is deep. These relationships are of course not critical. The top and bottom walls **20** and **22**, respectively, which form the recess **16**, are perforated to provide aligned vertical openings **24** and **26** which pass from the outside through the wall into the recess **16**. These two perforations are located quite close to the front face **18** of the housing, and are preferably along the center line of the housing.

The entire case and mounting tab **11** as described above is formed in one piece by any conventional process such as by plastics molding or die casting for instance. A good substance for the purpose is one characterized by reasonable toughness and dimensional stability and some resiliency. Medium impact polystyrene is well suited and relatively low in cost although other materials can of course be used. The use of a resilient substance has some advantage during assembly, as will appear presently, and in addition offers considerable protection to dishes and glassware which might be bumped against the magnet housing as they are inserted and removed from the shelves.

Two magnet pole pieces are provided, and these are indicated at **28**. They may suitably be formed of iron or low carbon steel, and are simply cut from flat stock of appropriate thickness and formed to L shape, as shown. The two pole pieces are identical and have an over all length slightly greater than the depth of the recess **16** and a height which is slightly less than the similar recess dimension. These two pole pieces are dropped into the recess **16** with their longest flat sides against the side faces of the recess as seen in Fig. 1, and with their bent-over ears **30** facing toward each other. These tabs are against the innermost face of the recess.

After these pole pieces are in place, a rectangular flat spacer member **32** is dropped into the open mouth of the recess **16** so that it lies against the faces of the L-shaped extensions **30**. This member can suitably be manufactured at extremely low cost by being cut or punched from ordinary cardboard. Its purpose is to prevent the magnetized member from coming into direct contact with the inwardly extending ears **30**.

The magnet member which is indicated at **34** is a cast slug, preferably formed of one of the Alnico alloys. It is shown as a generally rectangular bar section with two of the contiguous long edges beveled as at **36**, but preferably with its two ends ground flat and parallel with each other. Slugs of this shape are regularly cast as sticks or bars with deep score lines between the individual slugs. Thus individual slugs can easily be broken from the sticks along the score lines, the score lines forming the beveling referred to above. Conveniently the grinding operation is conducted before the bars are broken up.

The over all length of the permanent magnet **36** is slightly less than the dimension between the inside faces of the two pole pieces **28** when these pole pieces are within the recess **16** and against the side walls thereof. The slug **36** therefore can be readily pushed into the mouth of the housing between the pole pieces so that its back surface is against the spacer **32**. The longitudinal dimension of the magnet **34** is not critical since the magnet will attract the pole pieces inwardly so as to provide good contact between its ends and these two iron members and the assembly of the pole pieces and magnet preferably has a loose fit in the case in any event.

The remaining element is indicated at **38** and provides a closure for the opening between the pole pieces **28** and also serves to retain the magnet and pole pieces in the case. It is formed of nonmagnetic material and conveniently can be of any such substance having sufficient strength for the purpose if a resilient case is provided. In general its contour is rectangular and its length is slightly less than the distance between the inner surfaces of the pole pieces **28**. Its height is equivelent to the distance between the top and bottom walls of the housing. Its thickness from front to back is slightly less than the distance between the front face of the magnet **34** when it is in assembled relationship to the other element and the front face **18** of the case. At its top and bottom edges, at the midpoints thereof, it has outward projections **40** which fit into the holes **24** and **26**. The front faces of these projections extend at right angles to the top and bottom edges of the member **38**, whereas the back surfaces thereof are tapered inwardly and rearwardly so that they merge with the top and bottom surfaces of the keeper or closure **38**.

If the keeper is rigid and the case resilient, the keeper is inserted simply by locating it in front of the opening between the pole pieces and forcing it inwardly with an arbor press or the equivalent, thereby causing the tapered ends of the tabs **40** to wedge the top and bottom of the case outwardly so that the keeper moves inwardly into the recess until the tabs snap into place in the openings **24** and **26**. When it is in place, with both of the tabs **40** located in their respective openings **24** and **26**, the keeper confines the magnet and pole piece assembly slightly loosely.

If a relatively rigid case is provided, the keeper is preferably formed of a resilient plastic substance which will temporarily deform during the assembly operation, the assembly being conducted in substantially the manner indicated above.

With either type of construction, the outer ends of the pole pieces **28** project slightly beyond any portion either of the case **10** or the keeper **38**. No portion of the case, therefore, interferes with an armature **42** being brought into contact with these pole pieces, and therefore the longitudinal dimension of the pole forming members need not be accurately held with respect to the depth of the recess **16**. It should be noted also that good contact is insured between the pole pieces **28** and the magnet **34** without the necessity for welding these elements into a single assembly and that the pole pieces and magnet are free to float slightly within the case so as to obtain good contact between the armature and pole pieces even when a reasonable amount of misalignment is present in the installation.

Although assembly of the device has been described above on the basis of a step-by-step procedure, it will be appreciated that the pole pieces **28**, the spacer member **32**, the magnet **34** and the keeper **38** can be preassembled, the preassembly then being pressed into the case as a unit.

From the above description of a preferred embodiment of my invention it will be appreciated that variations and substitutions can be made without departing from the scope or spirit of the invention, and that the scope of the invention is to be measured by the scope of the following claims.

Having described my invention, what I claim as new and useful and desire to secure by Letters Patent of the United States is:

1. In a magnetic door catch, a resilient housing having a generally rectangular recess therein and providing a means of attachment of the housing to a surface, a pair of pole pieces formed of magnetic material, each of said pole pieces having an L shape to provide an outstanding portion and a shorter portion at right angles thereto, said pole pieces being disposed in said recess against the opposite sides thereof with their shorter portions against the bottom thereof and pointed toward each other, the length of said pole pieces being slightly greater than the depth of said recess, a flat resilient spacer member disposed in the space between the outstanding portions of said pole pieces and against said shorter portions, a bar magnet disposed with its ends in contact with the adjacent side faces of said pole pieces and in a position against said resilient spacer member, a keeper disposed in said recess against said bar magnet and substantially filling the space between said pole pieces, said housing and said keeper having mutual engaging means to retain said keeper in said recess, and said mutual engaging means operating to spread said housing when said keeper is part way into said recess, but to permit said housing to return to substantially its original form when said keeper is against said magnet.

2. In a magnetic door catch, a housing having a generally rectangular recess therein and providing a means of attachment of the housing to a surface, a pair of pole pieces formed of magnetic material, each of said pole pieces having an L shape to provide an outstanding portion and a shorter portion at right angles thereto, said pole pieces being disposed in said recess against the opposite sides thereof with their shorter portions pointed toward each other, the length of said pole pieces being sufficient to cause the outer ends thereof to extend to the opening of said recess, a spacer member disposed in the space between the outstanding portions of said pole pieces and against said shorter portions, a bar magnet loosely disposed with its ends in contact with the adjacent side faces of said pole pieces and in a position against said spacer member, a keeper disposed in said recess against said bar magnet and within the space between said pole pieces, and means for retaining said keeper in said recess.

3. In a magnetic door catch, a housing having a generally rectangular recess therein and providing a means of attachment of the housing to a surface, a pair of pole pieces formed of magnetic material, each of said pole pieces having an L shape to provide an outstanding portion and a shorter portion at right angles thereto, said pole pieces being disposed in said recess against the opposite sides thereof with their shorter portions pointed toward each other, the length of said pole pieces being sufficient to cause the outer ends thereof to extend to the opening of said recess, a spacer member disposed in the space between the outstanding portions of said pole pieces and against said shorter portions, a bar magnet loosely disposed with its ends in contact with the adjacent side faces of said pole pieces and in a position against said spacer member, a keeper disposed in said recess against said bar magnet and within the space between said pole pieces, and means for retaining said keeper in said recess, said keeper when in retained position acting to retain said magnet, said spacer and said pole pieces loosely within said case so as to permit limited movement of said pole pieces and magnet as a unit relative to said case.

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